FIG. 1

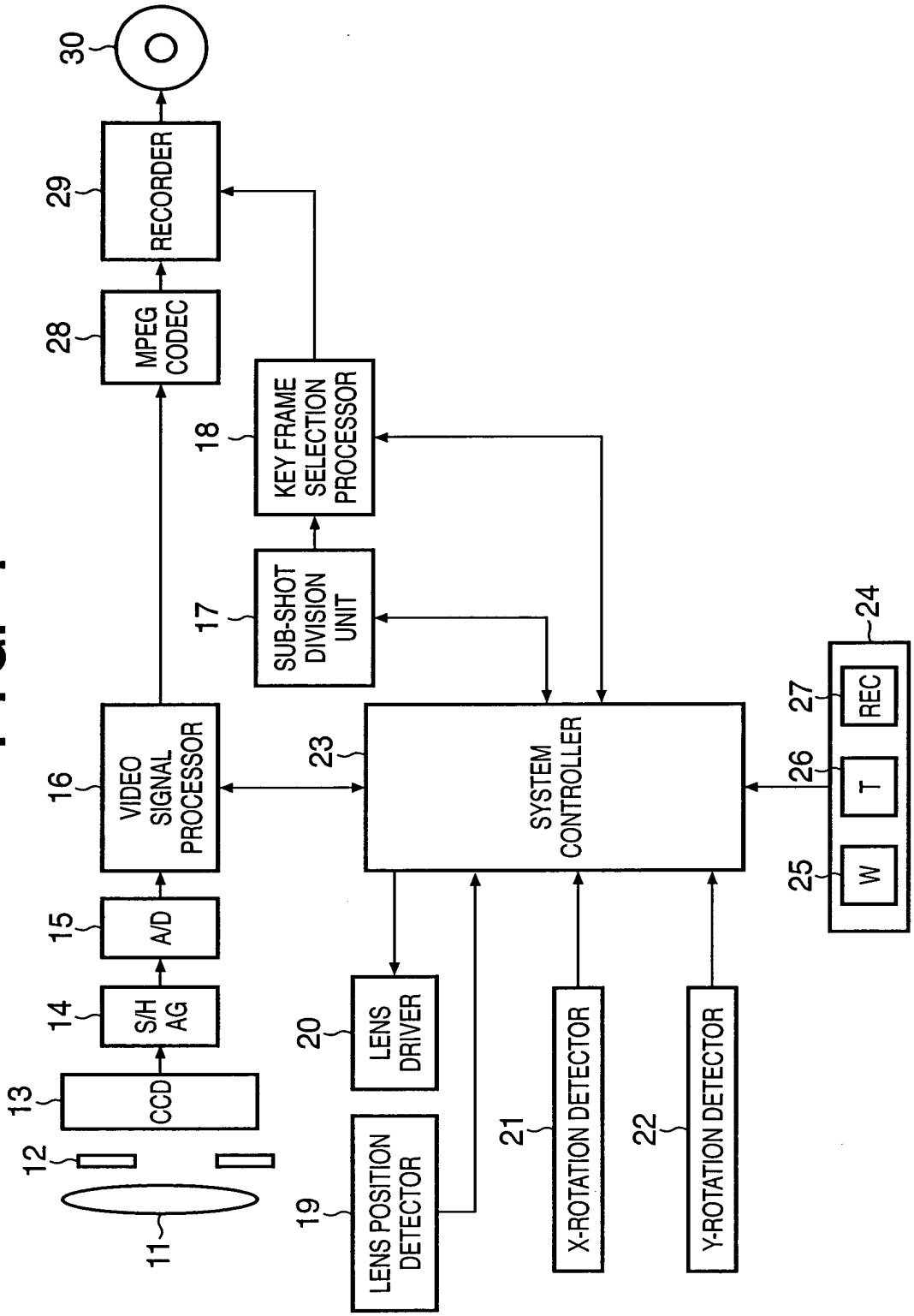

30
29
RECORDER
28
MPEG CODEC
18
KEY FRAME SELECTION PROCESSOR
17
SUB-SHOT DIVISION UNIT
16
VIDEO SIGNAL PROCESSOR
23
SYSTEM CONTROLLER
24
27
REC
26
T
25
W
15
A/D
14
S/H AG
13
CCD
12
11
20
LENS DRIVER
19
LENS POSITION DETECTOR
21
X-ROTATION DETECTOR
22
Y-ROTATION DETECTOR

FIG. 2

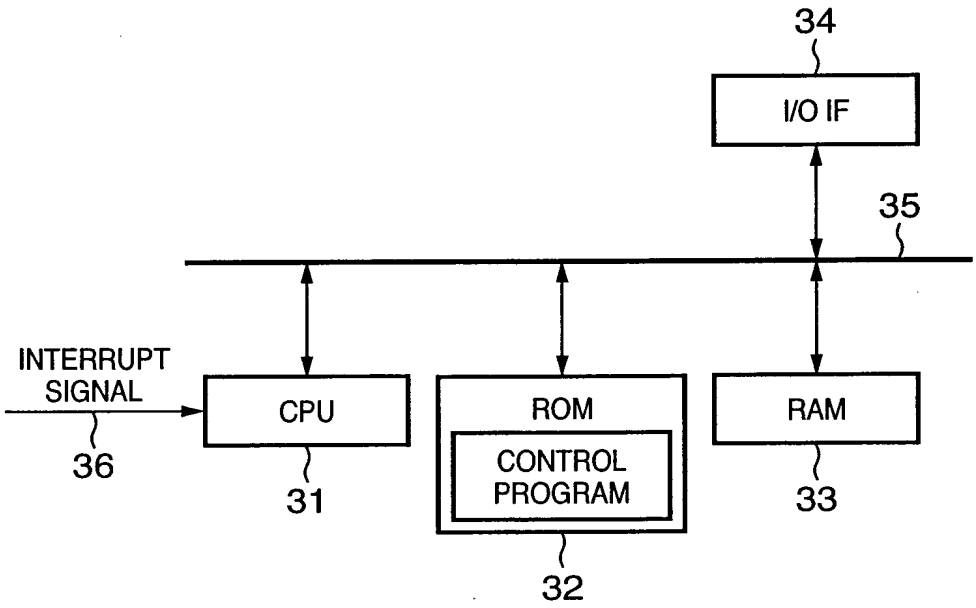
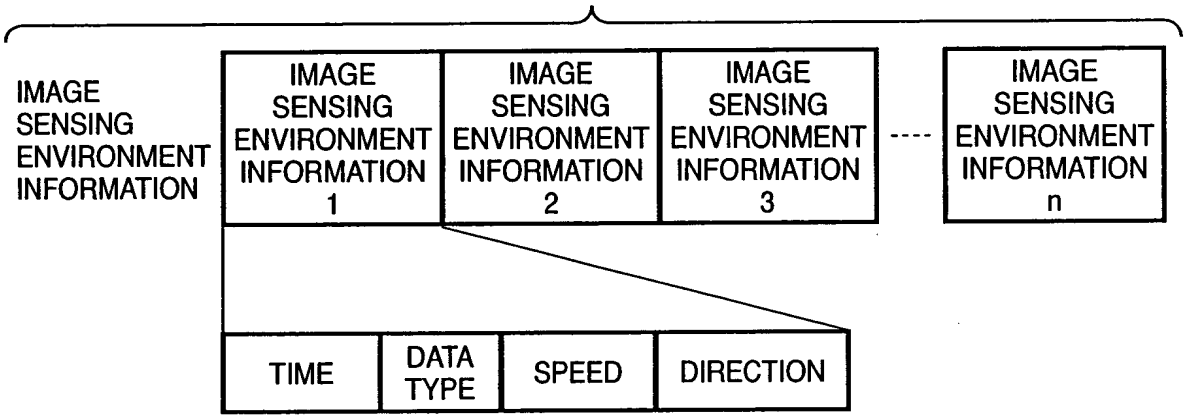

34
I/O IF
35
INTERRUPT SIGNAL
36
CPU
31
ROM
CONTROL PROGRAM
32
RAM
33

FIG. 3



TIME [32 BIT]

DESCRIBE FRAME NUMBER WITH REFERENCE TO HEAD OF MOVING IMAGE FILE

DATA TYPE [8 BIT]

DESCRIBE INFORMATION TYPE OF IMAGE SENSING ENVIRONMENT INFORMATION

0...PAN START

1...PAN CONTINUATION

2...PAN END

4...TILT START

5...TILT CONTINUATION

6...TILT END

SPEED [3 BIT]

DESCRIBE PAN/TILT SPEED IN 7 LEVELS WHEN DATA TYPE = 0, 1, 4, or 5

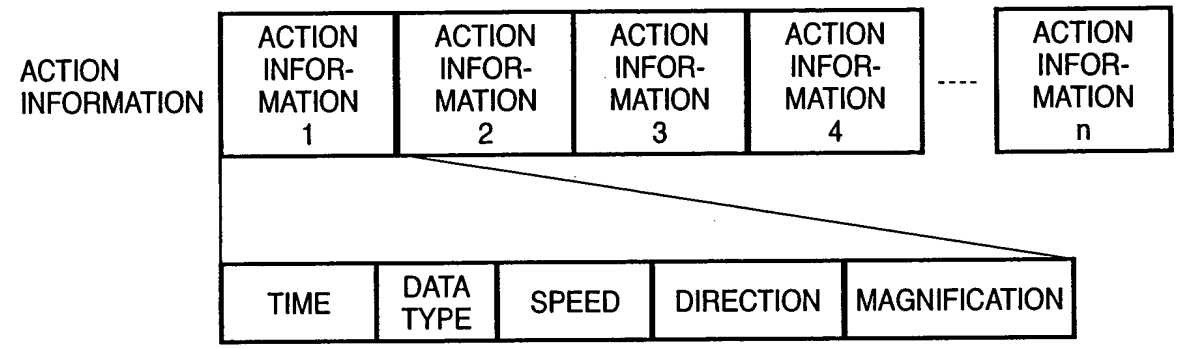
1...LOWEST SPEED 7...HIGHEST SPEED

DIRECTION [1 BIT]

DESCRIBE PAN (RIGHT/LEFT) OR TILT (UP/DOWN) DIRECTION WHEN DATA TYPE = 0, 1, 4, or 5

0...LEFT OR DOWN 1...RIGHT OR UP

FIG. 4



TIME [32 BIT]

DESCRIBE FRAME NUMBER WITH REFERENCE TO HEAD OF MOVING IMAGE FILE

DATA TYPE [8 BIT]

DESCRIBE INFORMATION TYPE OF IMAGE SENSING ENVIRONMENT INFORMATION

0...ZOOM START

1...ZOOM CONTINUATION

2...ZOOM END

3...VIDEO RECORDING START

4...VIDEO RECORDING END

SPEED [3 BIT]

DESCRIBE ZOOM SPEED IN 7 LEVELS WHEN DATA TYPE = 0, 1, OR 2

1...LOWEST SPEED 7...HIGHEST SPEED

DIRECTION [1 BIT]

DESCRIBE ZOOM DIRECTION WHEN DATA TYPE = 0, 1, OR 2

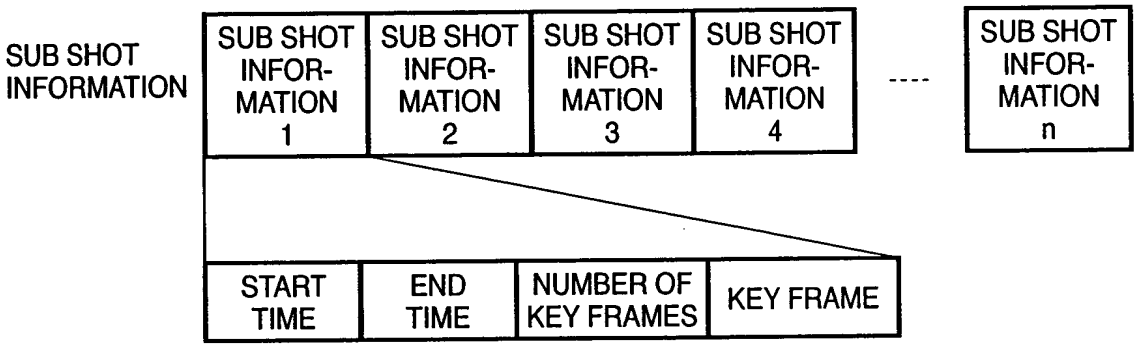
0...TELE SIDE 1...WIDE SIDE

MAGNIFICATION [5 BIT]

DESCRIBE ZOOM MAGNIFICATION IN 32 LEVELS WHEN DATA TYPE = 0, 1, OR 2

0...TELE SIDE 31...WIDE SIDE

FIG. 5



START TIME [32 BIT]

DESCRIBE START POINT USING FRAME NUMBER WITH REFERENCE TO HEAD OF MOVING IMAGE FILE

END TIME [32 BIT]

DESCRIBE END POINT USING FRAME NUMBER WITH REFERENCE TO HEAD OF MOVING IMAGE FILE

NUMBER OF KEY FRAMES [8 BIT]

DESCRIBE NUMBER OF KEY FRAMES

KEY FRAME [32 BIT * N]

DESCRIBE KEY FRAME USING FRAME NUMBER WITH REFERENCE TO HEAD OF MOVING IMAGE FILE

KEY FRAME FIELDS LINE UP IN CORRESPONDENCE WITH NUMBER DESIGNATED BY NUMBER OF KEY FRAMES

FIG. 6

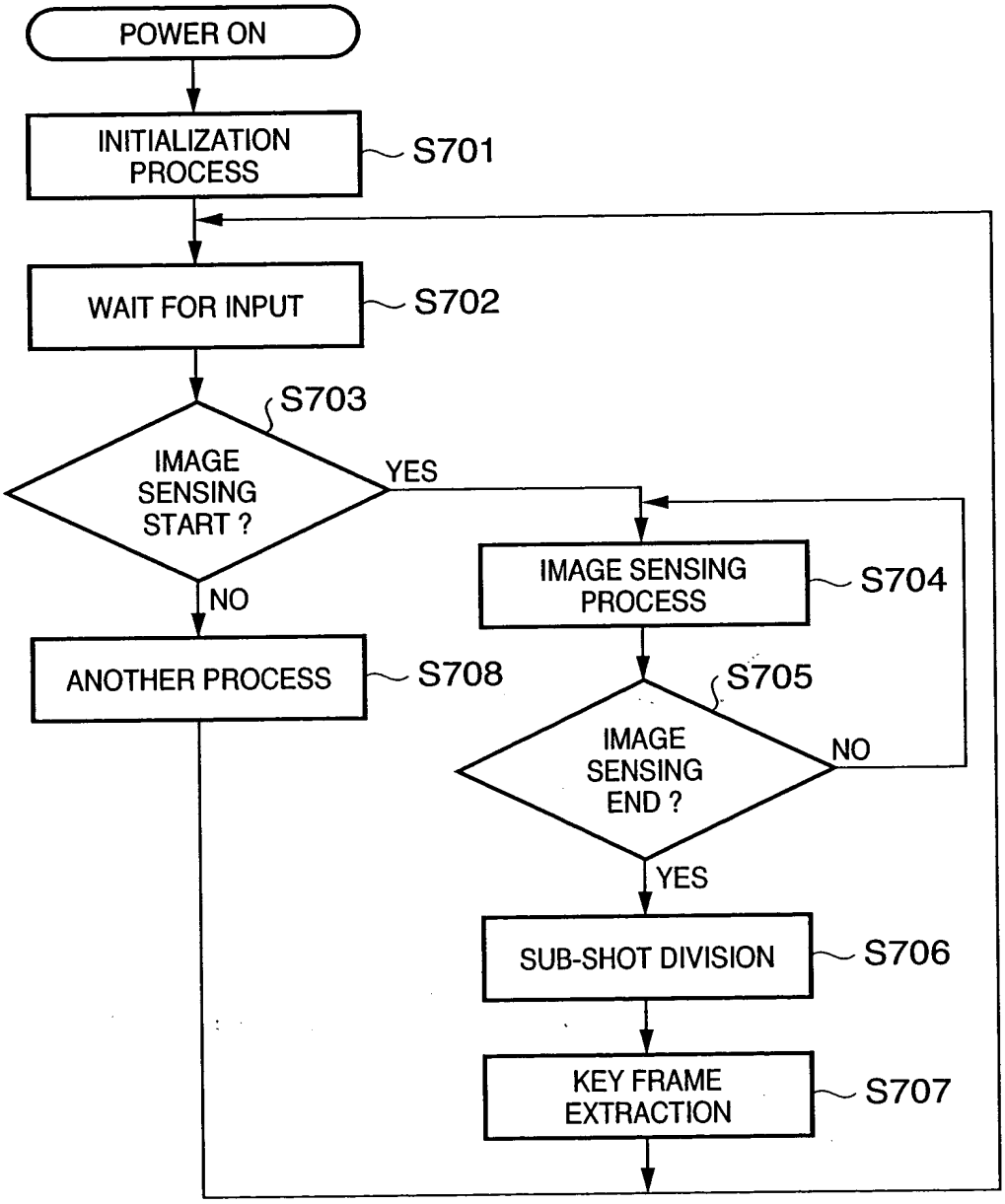

POWER ON
INITIALIZATION PROCESS
S701
WAIT FOR INPUT
S702
S703
IMAGE SENSING START ?
YES
NO
ANOTHER PROCESS
S708
IMAGE SENSING PROCESS
S704
S705
IMAGE SENSING END ?
NO
YES
SUB-SHOT DIVISION
S706
KEY FRAME EXTRACTION
S707

FIG. 7

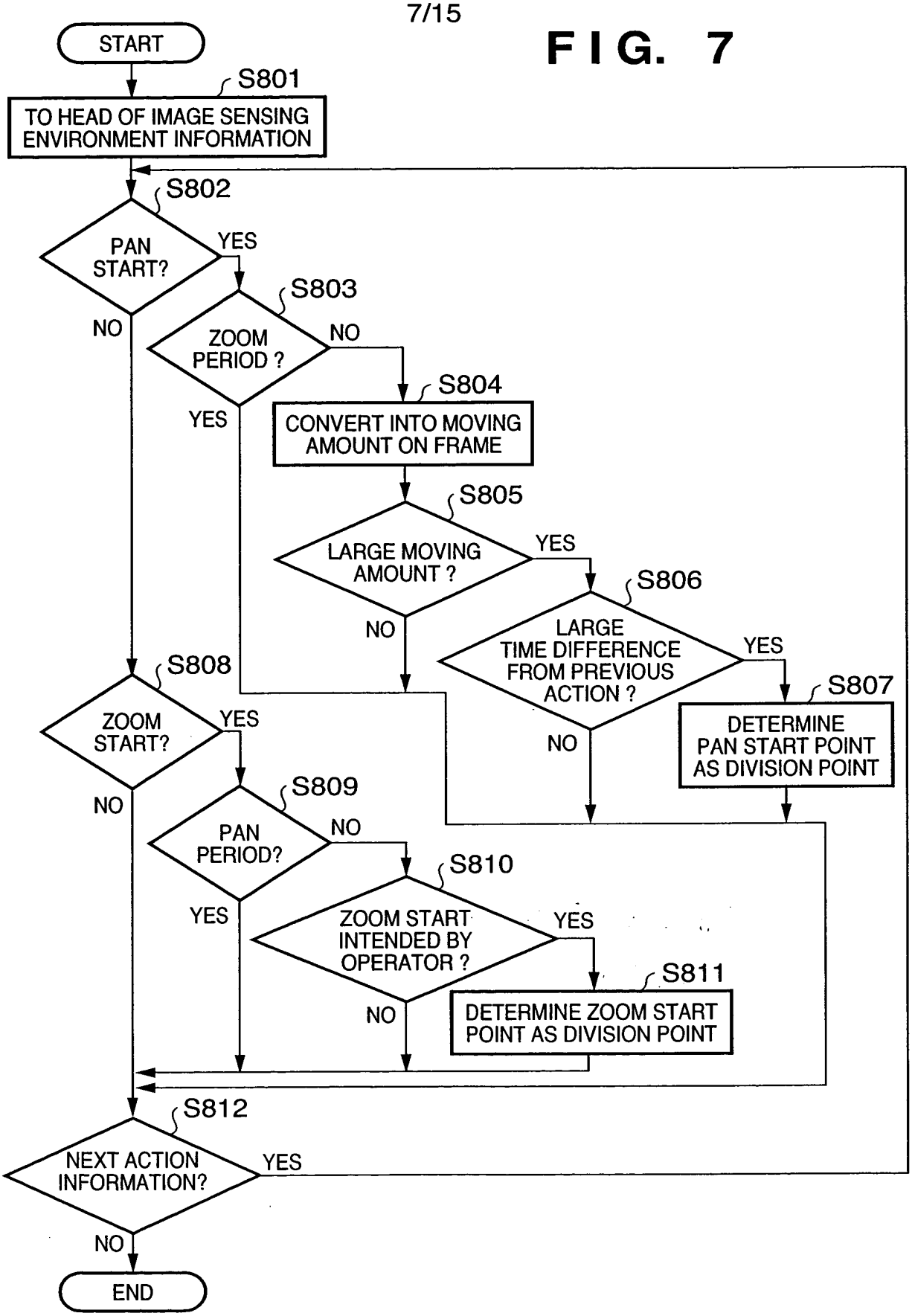

START
S801
TO HEAD OF IMAGE SENSING ENVIRONMENT INFORMATION
S802
PAN START?
YES
NO
S803
ZOOM PERIOD ?
NO
YES
S804
CONVERT INTO MOVING AMOUNT ON FRAME
S805
LARGE MOVING AMOUNT ?
YES
NO
S806
LARGE TIME DIFFERENCE FROM PREVIOUS ACTION ?
YES
NO
S807
DETERMINE PAN START POINT AS DIVISION POINT
S808
ZOOM START?
YES
NO
S809
PAN PERIOD?
NO
YES
S810
ZOOM START INTENDED BY OPERATOR ?
YES
NO
S811
DETERMINE ZOOM START POINT AS DIVISION POINT
S812
NEXT ACTION INFORMATION?
YES
NO
END

FIG. 8

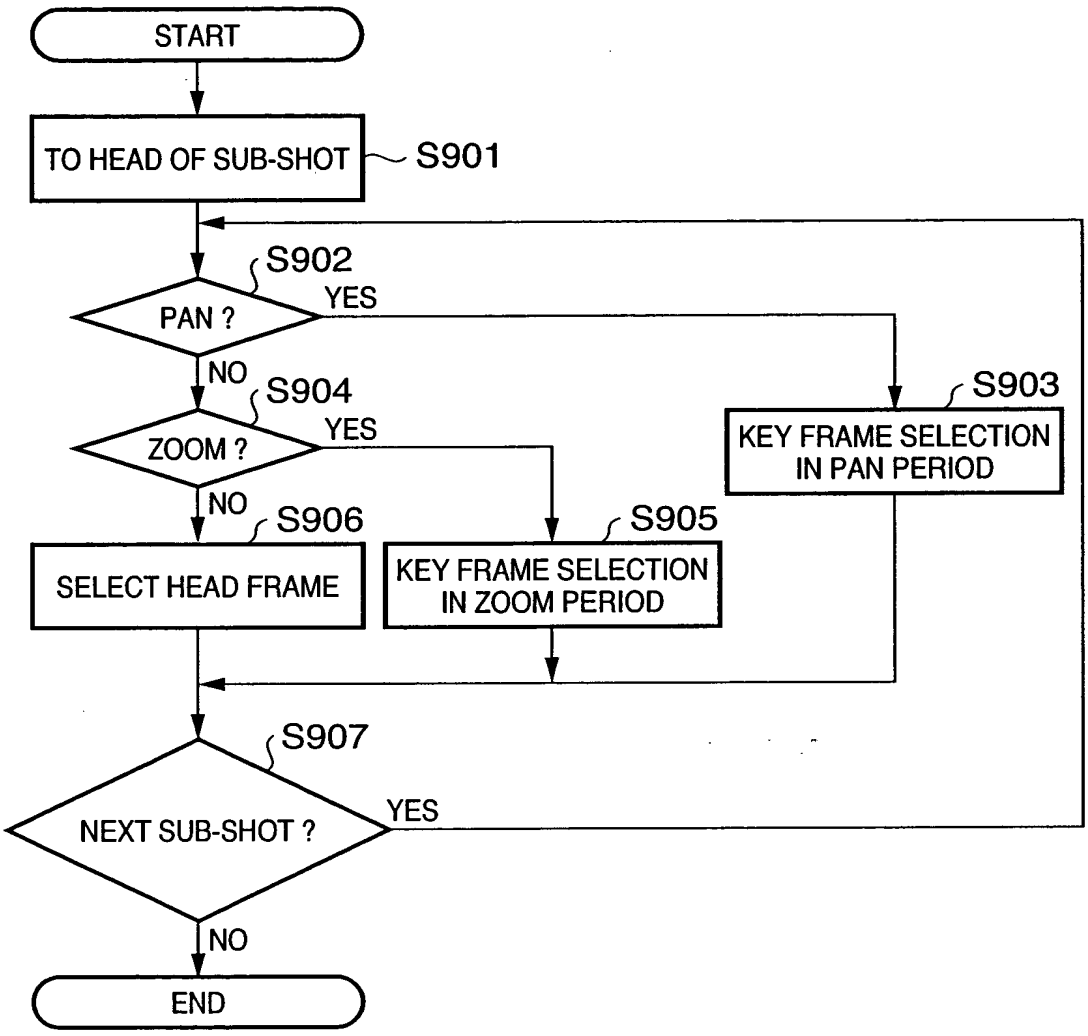

START
TO HEAD OF SUB-SHOT
S901
S902
PAN ?
YES
NO
S904
ZOOM ?
YES
NO
S903
KEY FRAME SELECTION IN PAN PERIOD
S906
SELECT HEAD FRAME
S905
KEY FRAME SELECTION IN ZOOM PERIOD
S907
NEXT SUB-SHOT ?
YES
NO
END

FIG. 9

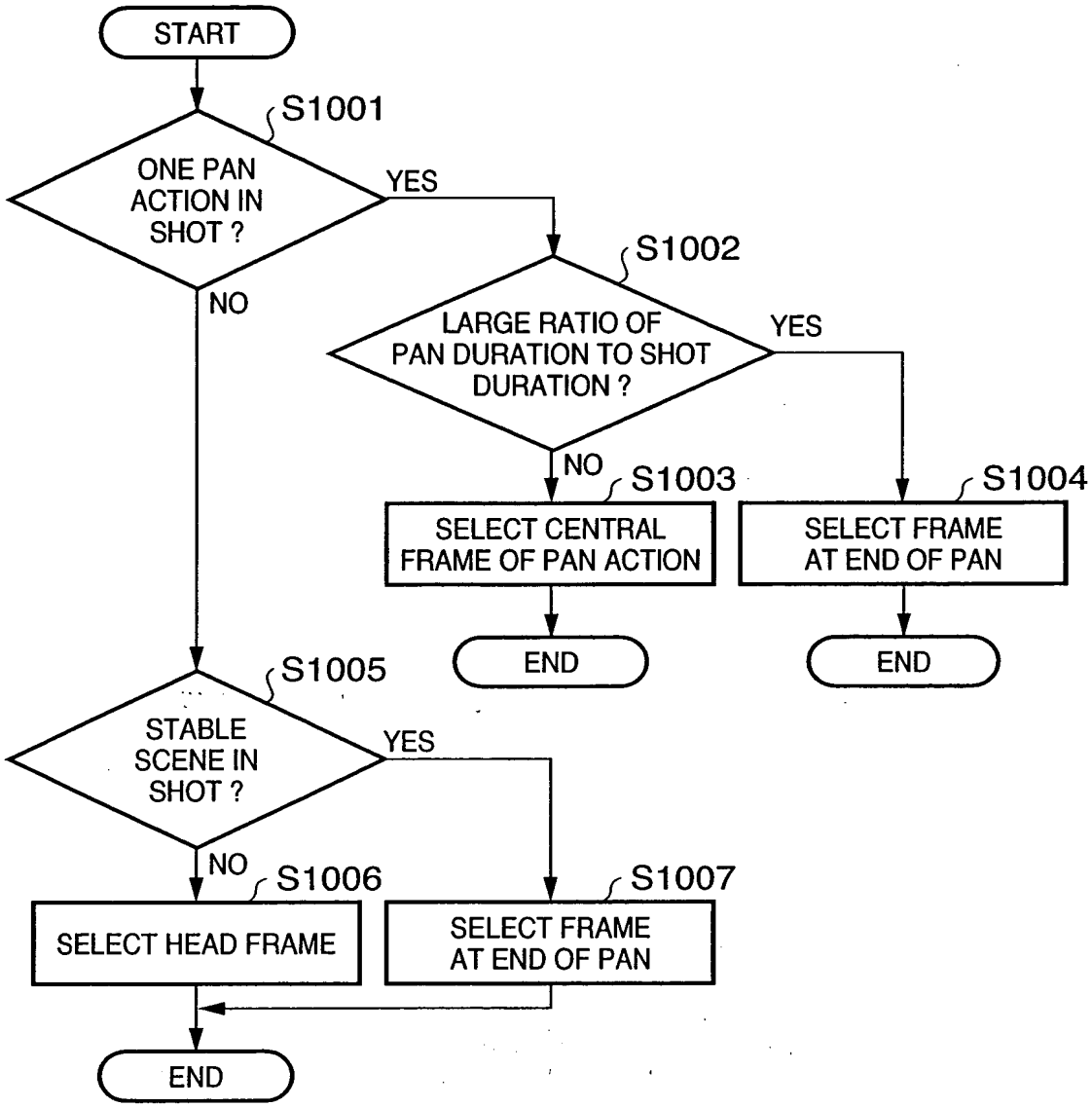

START
S1001
ONE PAN ACTION IN SHOT ?
YES
NO
S1002
LARGE RATIO OF PAN DURATION TO SHOT DURATION ?
YES
NO
S1003
SELECT CENTRAL FRAME OF PAN ACTION
S1004
SELECT FRAME AT END OF PAN
END
END
S1005
STABLE SCENE IN SHOT ?
YES
NO
S1006
SELECT HEAD FRAME
S1007
SELECT FRAME AT END OF PAN
END

FIG. 10

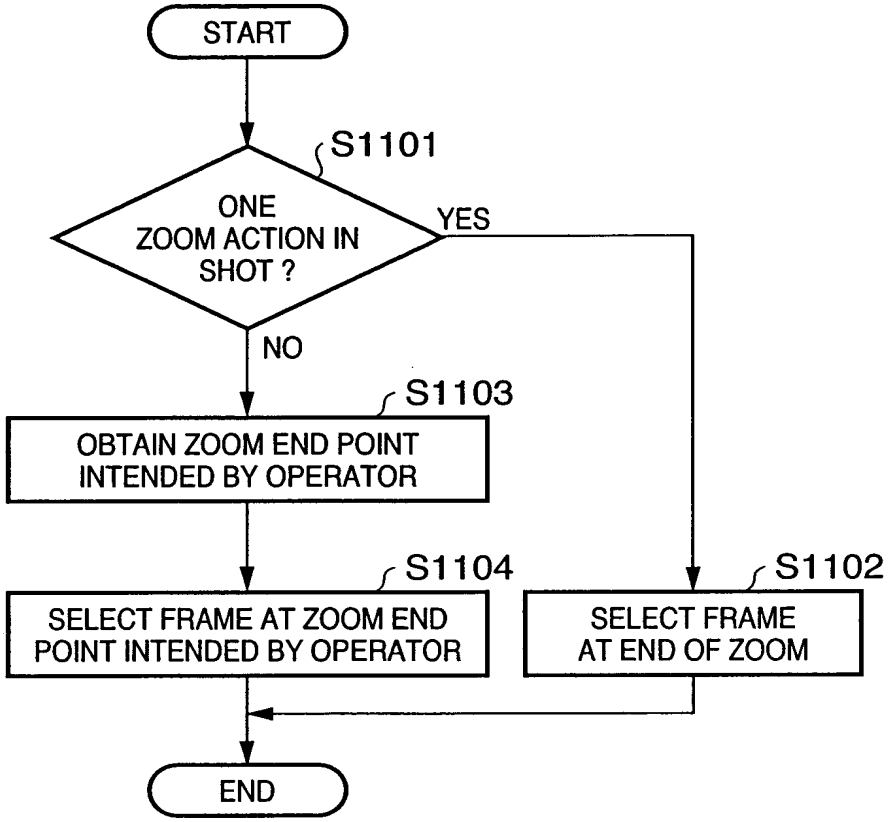
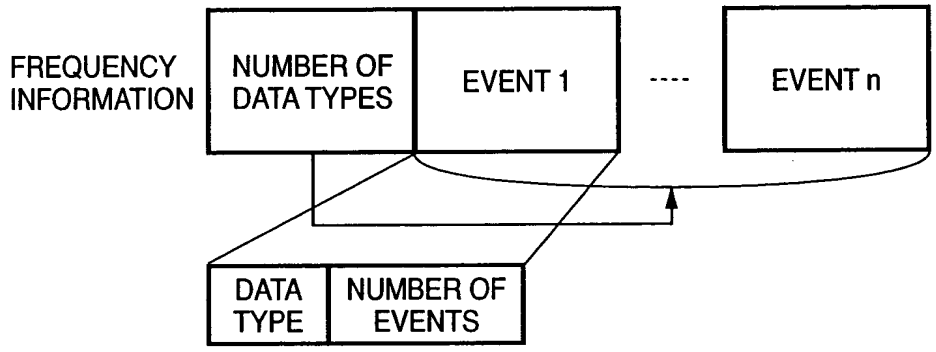

START
S1101
ONE ZOOM ACTION IN SHOT ?
YES
NO
S1103
OBTAIN ZOOM END POINT INTENDED BY OPERATOR
S1104
SELECT FRAME AT ZOOM END POINT INTENDED BY OPERATOR
S1102
SELECT FRAME AT END OF ZOOM
END

FIG. 11



NUMBER OF DATA TYPES [16 BIT]

DESCRIBE NUMBER OF FOLLOWING INFORMATION TYPES

DATA TYPE [8 BIT]

DESCRIBE INFORMATION TYPE OF ACTION INFORMATION / IMAGE SENSING ENVIRONMENT INFORMATION

0...ZOOM 1...PAN 2...TILT

NUMBER OF EVENTS [32 BIT]

DESCRIBE NUMBER OF TIMES OF START OF EVENT DESIGNATED BY DATA TYPE

FIG. 12

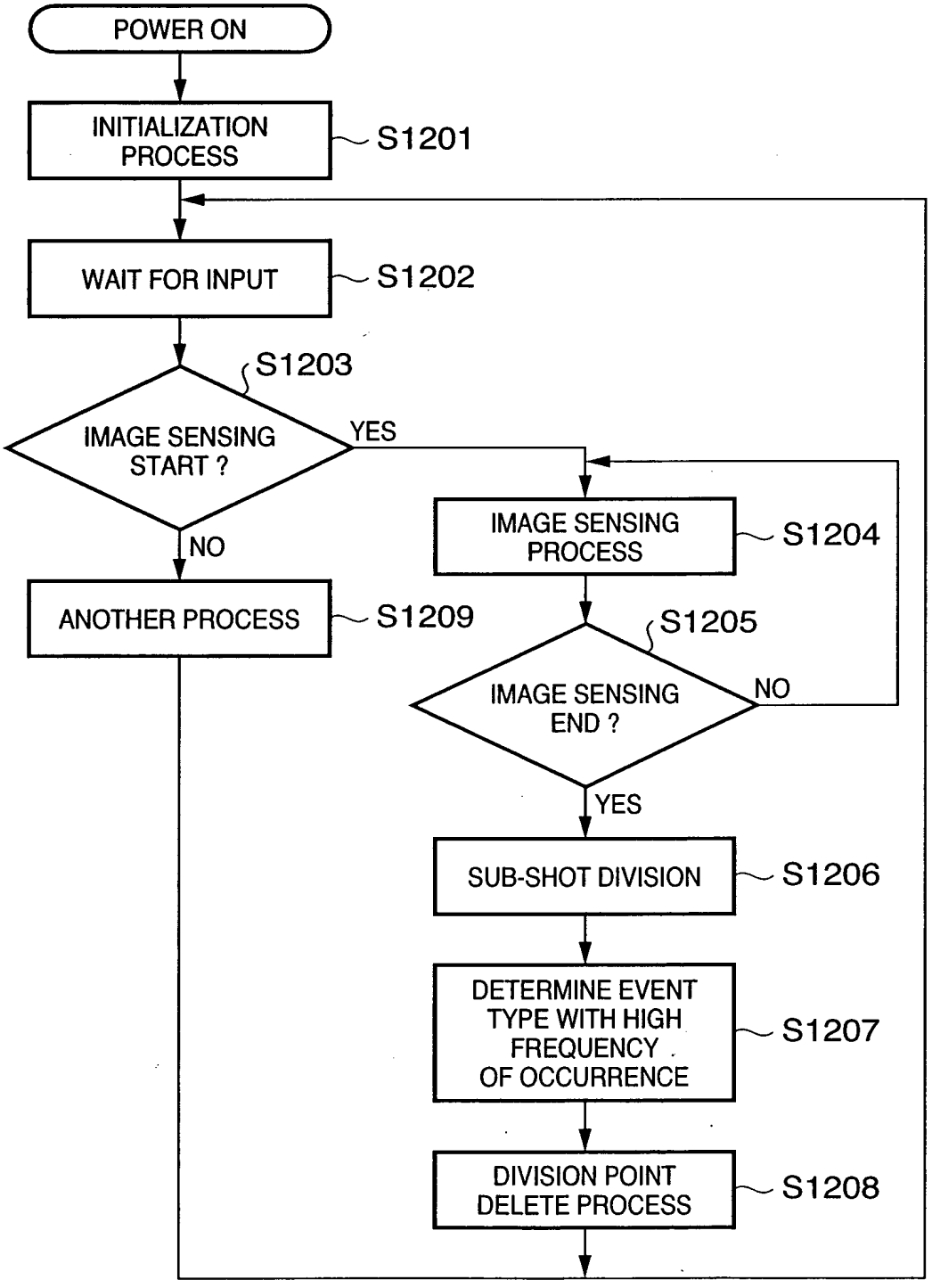

POWER ON
INITIALIZATION PROCESS
S1201
WAIT FOR INPUT
S1202
S1203
IMAGE SENSING START ?
YES
NO
ANOTHER PROCESS
S1209
IMAGE SENSING PROCESS
S1204
S1205
IMAGE SENSING END ?
NO
YES
SUB-SHOT DIVISION
S1206
DETERMINE EVENT TYPE WITH HIGH FREQUENCY OF OCCURRENCE
S1207
DIVISION POINT DELETE PROCESS
S1208

FIG. 13

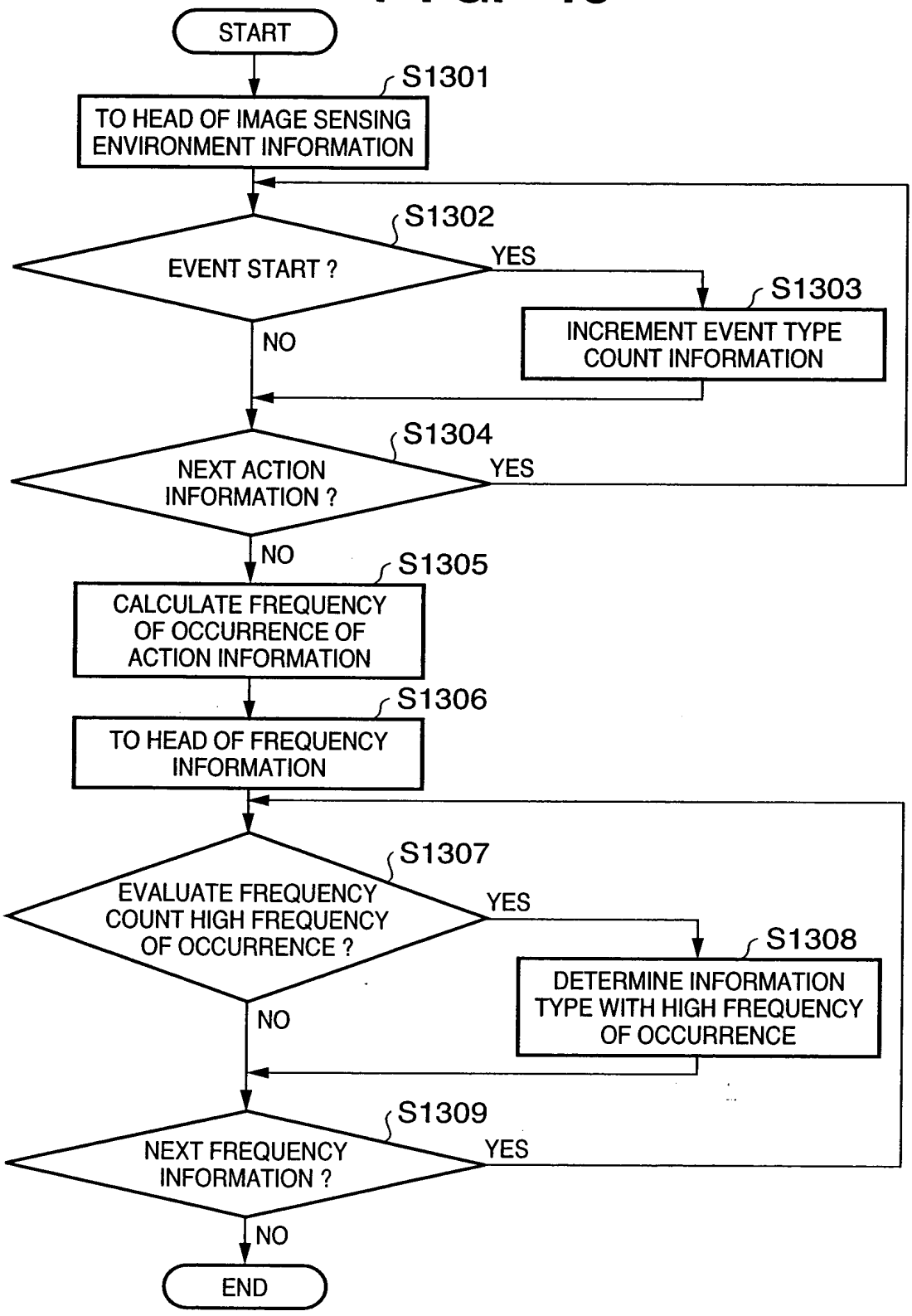

START
S1301
TO HEAD OF IMAGE SENSING ENVIRONMENT INFORMATION
S1302
EVENT START ?
YES
S1303
INCREMENT EVENT TYPE COUNT INFORMATION
NO
S1304
NEXT ACTION INFORMATION ?
YES
NO
S1305
CALCULATE FREQUENCY OF OCCURRENCE OF ACTION INFORMATION
S1306
TO HEAD OF FREQUENCY INFORMATION
S1307
EVALUATE FREQUENCY COUNT HIGH FREQUENCY OF OCCURRENCE ?
YES
S1308
DETERMINE INFORMATION TYPE WITH HIGH FREQUENCY OF OCCURRENCE
NO
S1309
NEXT FREQUENCY INFORMATION ?
YES
NO
END

FIG. 14

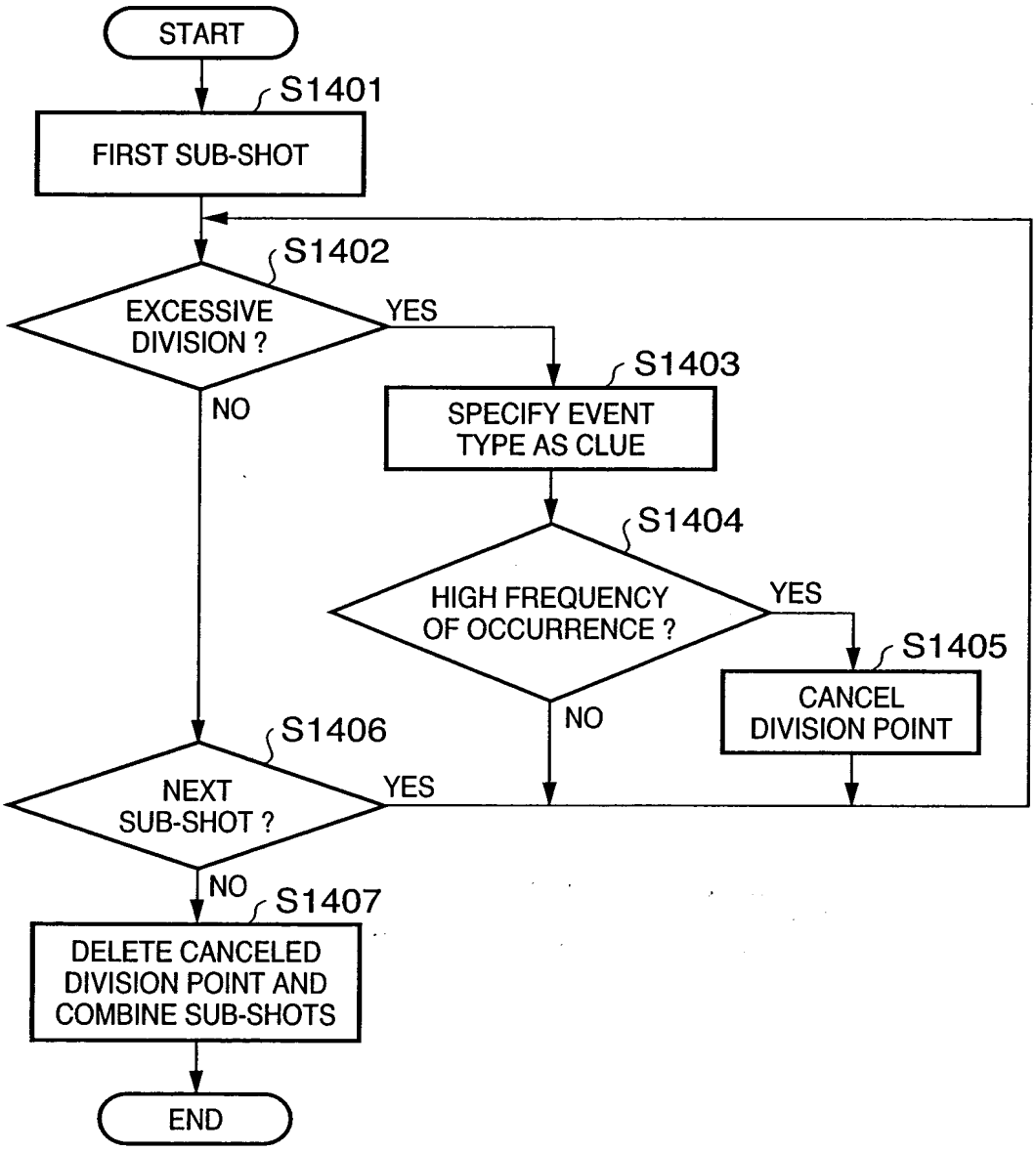
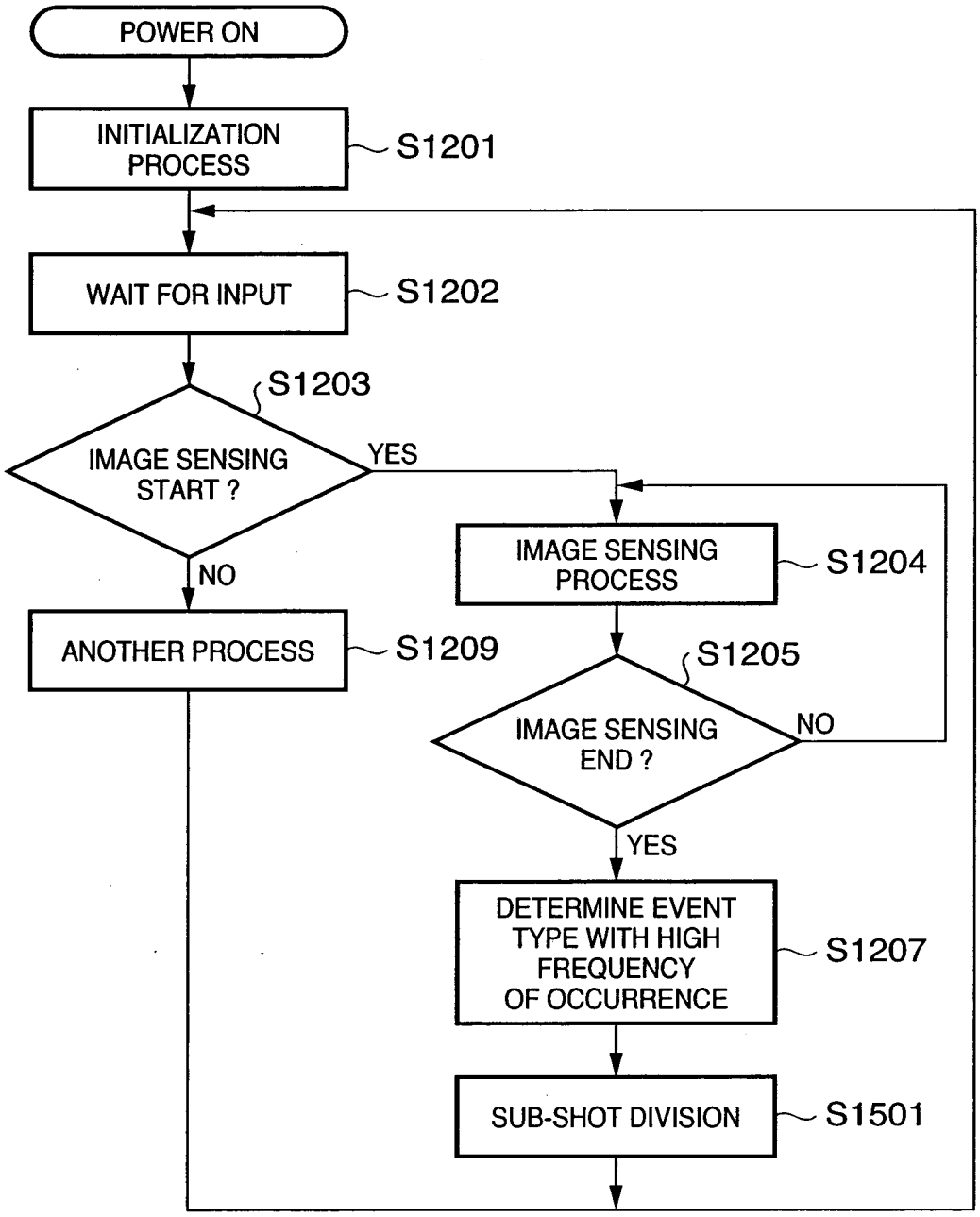

START
S1401
FIRST SUB-SHOT
S1402
EXCESSIVE DIVISION ?
YES
NO
S1403
SPECIFY EVENT TYPE AS CLUE
S1404
HIGH FREQUENCY OF OCCURRENCE ?
YES
NO
S1405
CANCEL DIVISION POINT
S1406
NEXT SUB-SHOT ?
YES
NO
S1407
DELETE CANCELED DIVISION POINT AND COMBINE SUB-SHOTS
END

FIG. 15


POWER ON
INITIALIZATION PROCESS
S1201
WAIT FOR INPUT
S1202
S1203
IMAGE SENSING START ?
YES
NO
ANOTHER PROCESS
S1209
IMAGE SENSING PROCESS
S1204
S1205
IMAGE SENSING END ?
NO
YES
DETERMINE EVENT TYPE WITH HIGH FREQUENCY OF OCCURRENCE
S1207
SUB-SHOT DIVISION
S1501